

DPD-2547-61

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21 April 1961

MEMORANDUM FOR : Assistant Chief, DPD-00/P  
THROUGH : Chief, Development Branch, DPD-00/P  
SUBJECT : Evaluation of T-28B Aircraft

1. At the request of the Assistant Chief, DPD, a limited flight test evaluation was made of the Navy T-28B aircraft. This evaluation consisted of one flight on 11 April 1961. Limited performance and qualitative stability and control characteristics were investigated. The flight time was two hours, including the time to fly to and from the test area some forty miles from Anacostia NAS.

2. The T-28B airplane, built by North American Aviation, is a two-place trainer equipped with dual controls and tricycle landing gear. The airplane is powered by a Wright Cyclone nine cylinder, air cooled, radial engine, Model R1920-36. This 1425 horsepower engine is equipped with a single stage two-speed supercharger, a direct cranking starter, and an injection type carburetor. The engine drives a three-blade, constant-speed, Hamilton Standard hydromatic propeller. Other aircraft features include a speed brake on the bottom of the fuselage, and instruments and communication equipment in each cockpit sufficient for instrument flying. It is possible to fit various armament packages externally under each wing panel. The approximate over-all dimensions are: length, 33 feet; wing span, 41 feet; and height (to top of rudder) 13 feet.

3. The results of the limited evaluation are as follows:

PREFLIGHT INSPECTION - The preflight walk-around inspection is quite simple and easily accomplished. The only item of special attention was the checking of the engine oil quantity level. The preflight inspection can be completed in less than three minutes.

ENTRANCE - Entrance to the cockpit is made from the left side starting to the rear of the flaps. Hand holds and "kick-in" foot steps are provided. The first step is high and is difficult when wearing the parachute. The canopy can be opened manually from a position on the wing. After the first high step, entrance is easy and no sharp protuberances hinder ingress.

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COCKPIT - The cockpit is spacious, comfortable, and logically arranged. The radios are located on the right side and too far aft. Under instrument flight conditions, this requires shifting of hands on the control stick and a large head change to see the radio controls. This operation is highly conducive to vertigo and has, in the past, been believed to be the primary cause of crashes immediately after take-off. Except for the cockpit heat control and the circuit breaker panel, all controls are duplicated in the rear cockpit. Due to the center of gravity location, solo flying is restricted to the front cockpit only. The standard Air Force radio headset plug (AEC-10) will not fit the Navy equipment. Regulations require the wearing of a "hard hat" during flight.

STARTING - The starting procedure is more complex and more difficult than on most other reciprocating engines. The direct drive starter switch, the engine prime switch, and magneto switch are all located at the right forward position of the cockpit. A long reach is required by the left hand to switch the magneto to "BOTH" while energizing and priming the engine with the right hand. After firing, the engine is run on "prime" until the throttle is re-adjusted for smooth engine operation. Then, the mixture control is advanced for normal engine operation.

TAXIING - Nose wheel steering is not provided for aircraft taxiing. However, good control of the aircraft can be maintained even in strong crosswinds by use of differential braking. Visibility during taxi operations is excellent.

RUN-UP - The engine run-up is quite simple and straight forward. During cold weather, the normal wait is required for engine oil and cylinder head temperatures to rise to minimum levels. Then, the check is made of propeller governor control, the supercharger control, and the magnetos. These checks can be accomplished ninety (90) seconds after engine warm-up.

TAKE-OFF - During the initial portion of the take-off roll, adequate directional control can be maintained with brake tapping. The rudder becomes effective for control prior to indication of the airspeed instrument, estimated speed is 30 to 35 knots. A fairly large rudder force is required even with a tab setting of 7° right rudder. Back stick force is moderate to raise the nose wheel. Forward visibility is slightly restricted when the nose is raised, but still satisfactory. As the gear is retracted, the airplane accelerates rapidly to climb speed. This increase in speed and the power reduction to normal rated power cause a large change in rudder force and trim to a left rudder setting. Due to adverse weather conditions, no tests could be run to determine take-off performance. The pilot's handbook quotes a ground run of 700 feet at a gross weight of 3,500 pounds when using

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half flaps.. Minimum run take-off is accomplished by lifting off at 60-65 knots. Visibility forward is greatly restricted under this condition, but lateral control is satisfactory.

CLIMB - Initial rate of climb is good. Using normal rated power, it takes four (4) minutes to climb to 10,000 feet. Visibility during the climb is good. The airplane can be easily trimmed in the climb configuration, but close attention must be given to the airspeed and manifold pressure to realize the maximum climb potential.

LEVEL FLIGHT PERFORMANCE - There was not sufficient instrumentation or time to evaluate level flight performance of the aircraft. However, pilot comments of the speed, range, and fuel consumption parameters indicate that the airplane very closely follows the performance curves of the handbook. Two typical figures are 0.92 nautical air miles per pound of fuel at sea level and 0.95 NAHWP at 5,000 feet. This gives 736 and 760 nautical miles range with 10% (100 pounds) of fuel reserve, using the clean configuration. Specific range of 1.0 NAHWP can be realized at 30,000 feet.

HANDLING CHARACTERISTICS - The general handling characteristics of the aircraft are very good. All controls are conventional and no unusual or dangerous conditions were encountered. At high speed (250 knots IAS), aileron forces are quite high and rate of roll is slow. Stick forces become fairly high also at high speed but turning rate is good. Stall characteristics are excellent with ample warning buffet and good aileron control all the way to stall speed. Recovery is rapid with little loss of altitude. A high degree of directional stability and dihedral effect are present. In rough air, lateral directional oscillations would cause aiming and firing at a "spot" target to be quite difficult. The speed brake is effective in preventing rapid airspeed build-up in a dive. Extension of the speed brake causes very little trim change. Like other single engine aircraft, any significant change in airspeed requires a change in rudder trim. The force can be trimmed to zero, but just having to do so degrades the gunnery capability. The airplane is easy to fly and does not exhibit any unusual flight characteristics. All flying was done in the clean configuration without any external stores.

APPROACH AND LANDING - With either half flaps or full flaps, visibility during the approach is excellent. Fairly large trim changes are encountered in reducing power, changing airspeed, and lowering gear and flaps. However, control of aircraft altitude and airspeed are easily maintained. Visibility is good during the "flare", but forward visibility is lost as the nose comes up through the horizon. This is more pronounced in half flap landings than with full flaps. It is

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possible to use full flaps even in strong gusty crosswinds without fear of losing control of the airplane. Braking action is good resulting in short landing rolls. Due to the lack of test facilities, the landing roll could not be measured. The handbook figure of 1,300 feet appears longer than the qualitative investigation. The qualitative estimate was approximately 900 feet.

4. In summary, the airplane is a simple, straight forward aircraft with no unusual or dangerous flight characteristics. It has a high degree of performance for a trainer and offers a good potential as a ground support fighter. Maintenance personnel do not report any chronic maintenance problems that have not been corrected over the period of years of service test and use.

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